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Appl. No. 10/007,186
Amdt. Dated: September 4, 2007
Office Action Dated: June 1, 2007**• • REMARKS/ ARGUMENTS • •**

The Official Action of June 1, 2007 has been thoroughly studied. Accordingly, the changes presented herein for the application, considered together with following remarks, are believed to be sufficient to place the application into condition for allowance.

By the present amendment, claim 5 has been changed to correct the typographical error noted by the Examiner.

Entry of the changes to the claims is respectfully requested.

Claims 1, 4 and 5 are pending in this application.

Claims 1, 4 and 5 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Ohkawa et al., *Influence of Temperature Prior to Seed Ripening and at Germination on Rosette Formation and Bolting of Eustoma Grandiflorum*, Scientia Horticulture, Volume 53, Issue 3, February 1993, Pages 225-230, in view of Coolbear et al, *An Evaluation of the Potential of Low Temperature Pre-Sowing Treatments of Tomato Seeds as Means of Improving Germination Performance*, Ann. appl. Biol. (1987), 110, pp. 185-194 (1987) and U.S. Patent No. 5,294,593 to Khan.

For the reasons set forth below, it is submitted that all of the pending claims are allowable over the prior art of record.

Favorable reconsideration by the Examiner is earnestly solicited.

The Examiner has relied upon Ohkawa et al. as teaching:

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...a known method of preventing rosette formation of plant seed which tend to suffer from rosette formation during growth by low temperature seed treatments of hydrated seeds at 3-5C for 5 weeks (Ohkawa abstract; *Eustoma grandiflorum*) and inherently prevents defective germination i.e. Ohkawa teaches leaving a plant seed to stand in a highly watery condition at a low temperature for a period of time from several days to inhibit rosette formation in a temperature from 0-15C.

The Examiner concedes that:

Ohkawa is silent on teaching that the plant seed is undergoes drying after immersion in the water and that the immersion and drying are conducted in a dark place.

The Examiner has relied upon Coolbear et al. as teaching:

...the seed treatment steps of leaving the plant seed to stand in a highly watery condition at a low temperature in a dark place for a period of time i.e. allowing seeds to imbibe water at 10C in darkness and then drying the seeds (Coolbear Methods, first paragraph) and inherently relative humidity of 100% (Coolbear teaches the seeds are in a cover dish and are continuously kept moist thus the humidity is 100%, Methods line 2-4). Coolbear teaches that these steps enhance germination rates and improve uniformity of germination (Coolbear Summary)

The Examiner takes the position that:

It would have been obvious to one of ordinary skill in the art to modify the teachings of Harbaugh with the teaching of Coolbear at the time of the invention to enhance germination rates and improve uniformity of germination as taught by Coolbear (Coolbear Summary).

The Examiner further states:

The process of exposing seeds to cold temperature is known in the art as vernalization. By definition, vernalization is the process in which a seed is subjected to a period of cold, causing changes that allow germination to occur, a period of cold temperatures required by certain plants before they will produce flowers and mature.

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The Examiner takes the position that:

The method steps taught by Coolbear is equivalent to vernilization.

The Examiner concludes:

Since the seeds are undergoing vernilization the methods prevent both defective germination and inherently prevent rosette formation to some extent.

In combining the teachings of Ohkawa et al. and Coolbear et al., the Examiner has taken the position that:

It would have been obvious...to modify the teachings of Ohkawa with the teachings of Coolbear...for the known advantage of preventing defective germination and for storage since it is general knowledge in the art that light and darkness have effects on germination.

Further, the Examiner states:

It would have been obvious...that is a particular seed is a light germinator it is desirable to treat and store seed in the dark to prevent premature germination.

The Examiner has relied upon Khan as teaching that:

...it is old and notoriously well-known to dry hydrated seeds in the dark to prevent a break in dormancy (Khan Co. 3 line 40-49).

The Examiner takes the position that:

It would have been obvious to one of ordinary skill in the art to modify the teachings of Ohkawa with the teachings of Khan at the time of the invention for preventing loss of dormancy for storing seeds for several months as taught by Khan (Khan Col. 3 line 50-52).

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Ohkawa et al. teaches a method of preventing rosette formation of plant seeds which tend to suffer from rosette formation during growth by low temperature seed treatments of hydrated seeds (*Eustoma grandiflorum*) at 3-5 °C for 5 weeks.

In Experiment 2, Ohkawa et al. recites:

Seeds of "Fukushihai" and "Miyakomomo" were hydrated at 28/23°C for up to 3 days and then stored at 3 or 10°C for 5 weeks. These treatments were given under *continuous irradiance* (15.0-25.3 $\mu\text{mol. M}^{-2}\text{s}^{-1}$). Upon completion of the 3 or 10°C temperature treatment, seedlings were transferred into a 22/28°C or 28/23°C (day/night) phytotron.

A careful comparison between the teachings of Ohkawa and applicant's invention reveals a number of significant differences including:

First, Ohkawa et al. teaches that the seeds are hydrated at 28/23°C for up to 3 days and thereafter (i.e. after the hydration step) stored at 3 to 10°C for 5 weeks. In contrast, applicant leaves the plant seed in a highly watery condition in which the plant seed is immersed in water at a temperature of from 0°C to 15°C.

Further, Ohkawa et al. teaches that the low temperature hydration treatment (as well as the 5 weeks of storage) is carried out under continuous irradiance. This is directly opposed to applicant's carrying out the low temperature treatment in a dark condition.

Further, Ohkawa et al. does not teach subjecting the seeds to a drying step.

In addition Ohkawa et al. teaches that after completion of the low temperature treatment the seed sprout. In contrast, applicant invention involves drying the seeds after the low temperature treatment so that the seeds can be stored.

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Ohkawa et al. teach that that seeds are hydrated for up to 3 days before being stored. By allowing for hydration "up to" 3 days Ohkawa et al. suggests that there is not criticality with length of the low temperature hydration period. That is, Ohkawa et al. clearly allows for hydration periods that are shorter than 3 days which are excluding by applicant's invention.

Applicant's invention requires "leaving the plant seed to stand in a highly watery condition at a low temperature in a dark place for a period of time of from several days to several months to inhibit defective germination and rosette formation of the plant seed, the dark place being sufficiently dark to prevent the plant seed from germinating."

Ohkawa et al. does not teach such limitations.

Coolbear et al. teaches the enhancement of germination performance in which, after completion of the low temperature treatment, the seeds are dried in open Petri dishes at room temperature. Moreover, moisture contents of generally four replicate samples were determined by drying the seeds at 130°C for 2 hours. Consequently, Coolbear et al. does not teach leaving the seed in a dark place and then drying the seeds in a dark place.

Khan teaches inducing releasable dormancy in non-dormant plant seeds for which gibberellin synthesis is necessary for germination. The method of inducing releasable dormancy taught by Khan includes the steps of (a) soaking the seed in a solution of gibberellin synthesis inhibitor of a concentration, temperature and time period that together induce dormancy; (b) washing the seed to remove the gibberellin synthesis from the seeds; and (c) drying the seeds to their original weight. Since Khan is concerned with providing an enhanced method of inducing releasable dormancy in non-

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dormant plant seeds, the teachings of Khan are substantially different from the teachings of Ohkawa et al. In this regard note that at column 4, lines 41-58 Khan specifically teaches that release of dormancy and germination are different phenomena:

Release of dormancy and germination are two distinct processes or events. Dormancy can be released without a seed showing any sign of germination (usually radicle protrusion). Unlike germination, dormancy release is reversible. Dormancy can be released but if temperature is not suitable for germination, seeds will not germinate. This is quite common under field conditions. Many crop seeds are dormant in autumn or at harvest time when they fall to the ground and lose their dormancy in the soil by winter chilling but do not germinate until the following spring or summer when the soil temperature (20.degree. to 30.degree. C.) and soil water potential (not too dry) is right for germination or seedling emergence.

After dormancy is released herein, the seeds have the ability to germinate under the conditions which permitted their germination prior to the inducing of dormancy herein.

The Examiner's statement that "Khan teaches that it is old and notoriously well-known to dry hydrated seeds in the dark to prevent a break in dormancy (Khan Col. 3 line 40-49)" appears to be based on a misunderstanding. This is because the drying step (c) is only carried out for the purpose of restoring the seeds to their weight prior to the soaking step. That is to say, the drying step (c) should not be understood as being carried out not to break dormancy.

Whereas the Examiner indicates that the drying in Khan has to be carried out in the dark, it is noted that Khan does not include such a teaching as regard to the effect on breaking dormancy.

Note at column 3, lines 40-49 Khan teaches that the drying can be carried out under green light or under light -- indicating that the drying step should not be understood as being carried out not to break dormancy.

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It accordingly it is submitted that Khan neither teaches nor suggests applicant's claim limitation of "leaving the plant seed to stand in a highly watery condition at a low temperature in a dark place for a period of time of from several days to several months to inhibit defective germination and rosette formation of the plant seed, the dark place being sufficiently dark to prevent the plant seed from germinating."

It is noted that the Examiner has relied upon specific teaching from each of Ohkawa et al. and Khan and proposed that the combination of the relied upon teachings of these references render applicant's claimed invention obvious.

The Examiner's position overlooks the fact that Ohkawa et al. and Khan have different and diverse objectives. That is, whereas Ohkawa et al. is concerned with preventing rosette formation, Khan is concerned with inducing dormancy by soaking seeds in gibberellin synthesis inhibitor.

Therefore, it is submitted that one skilled in the art would not be lead to the combination of teaches of these references which the Examiner purports to be obvious, absent improper hindsight on applicant's own disclosure.

Note the following table:

	Concern	Relied upon as teaching
Ohkawa et al.	Study Temperature Effects on Rosette Formation and Bolting	Low Temperature Hydration to Prevent Rosette Formation
Coolbear	Improve Germination	Low Temperature Hydration in the Dark
Khan	Inducing Dormancy in Non Dormant Seeds	Drying Seeds in the Dark

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Note Khan's teaching that "release of dormancy and germination are two distinct processes or events," is enough to establish that the teachings of Khan are not combinable with those of Coolbear.

Moreover, the fact that the prior art of record has not established that rosette formation, germination and releasing dormancy can be effectively controlled by common and mutually beneficial process steps precludes establishing a nexus that supports the combination of these diverse teachings.

Further the Examiner's position does not take into consideration as to any adverse effects that could be caused by the proposed combination. That is, Ohkawa et al. discovered results on bolting rates (Experiment 2) when Seeds of "Fukushihai" and "Miyakomomo" were hydrated at 28/23°C for up to 3 days and then stored at 3 or 10°C for 5 weeks under continuous irradiance (15.0-25.3 $\mu\text{mol. M}^{-2}\text{s}^{-1}$).

In order to establish that it would have been obvious to omit the continuous irradiance taught by Ohkawa et al. (i.e. depart from the specific teachings of Ohkawa), as the Examiner proposes to be "obvious" in his combination, there must be some teaching that such an omission would not be adverse to the results and objectives of Ohkawa et al. since the irradiance is one of the parameters reported by Ohkawa et al. Otherwise, there prior must teach a benefit for such omission that would apply to further the goals of Ohkawa et al. A proposed combination that would adversely effect Ohkawa et al. would be improper under the Board of Patent Appeals and Interferences' holding in *Ex parte Hartmann*, 186 USPQ 366 (PTO Bd App 1974).

Based upon the above distinctions between the prior art relied upon by the Examiner and the present invention, and the overall teachings of prior art, properly considered as a whole, it is

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respectfully submitted that the Examiner cannot rely upon the prior art as required under 35 U.S.C. §103 to establish a *prima facie* case of obviousness of applicant's claimed invention.

It is, therefore, submitted that any reliance upon prior art would be improper inasmuch as the prior art does not remotely anticipate, teach, suggest or render obvious the present invention.

It is submitted that the claims, as now amended, and the discussion contained herein clearly show that the claimed invention is novel and neither anticipated nor obvious over the teachings of the prior art and the outstanding rejections of the claims should hence be withdrawn.

Therefore, reconsideration and withdrawal of the outstanding rejection of the claims and an early allowance of the claims is believed to be in order.

It is believed that the above represents a complete response to the Official Action and reconsideration is requested.

If upon consideration of the above, the Examiner should feel that there remain outstanding issues in the present application that could be resolved, the Examiner is invited to contact applicant's patent counsel at the telephone number given below to discuss such issues.

To the extent necessary, a petition for an extension of time under 37 CFR §1.136 is hereby made. Please charge the fees due in connection with the filing of this paper, including extension of

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time fees, to Deposit Account No. 12-2136 and please credit any excess fees to such deposit account.

Respectfully submitted,



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